

## A Survey for Antibodies to Hepatitis C virus among Women of Childbearing Age

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**Abstract:** Hepatitis C virus (HCV) infection is now considered a pandemic. It has emerged as the most important cause of chronic liver disease world wide and an important cause of acute hepatitis and jaundice in pregnancy and its attendant complications. The disease prevalence was determined among 300 women of childbearing age attending Vom Christian Hospital, Plateau State, Nigeria. A structured questionnaire was administered to each subject to obtain data on socio-demographic and risk factors that may be associated with their predisposition to the infection. One step HCV immunochromatographic test strip was used for the screening. 27 (9.0%) subjects were seropositive. Women in the age group 26-30 years had the highest seroprevalence of 9.3%. There was no significant association between age and HCV seroprevalence ( $\chi^2 = 8.403$ ,  $df = 5$ ,  $P = 0.20$ ). Seropositivity in some subjects was linked to a number of risk factors which included scarification and multiple sex partnership. The results obtained indicate the presence of HCV in the study area and the need for effective awareness to educate the public on preventive measures against contraction and transmission of the disease.

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### 1. Introduction

Hepatitis C is an infectious disease affecting the liver. It is caused by Hepatitis C virus (HCV) Ryan & Ray,2004. The infection was referred to as a parenterally transmitted “non-A, non-B hepatitis” until identification of the causative agent in 1989. The discovery and characterization of HCV led to the understanding of its primary role in post transfusion hepatitis and its tendency to induce persistent infection (Choo,et al 1989 & Sharara et al,1996). It is estimated that there are more than 170 million chronic HCV carriers worldwide who are at risk of developing liver cirrhosis, liver cancer, or both Brooks et al,2007.

It is thought that HCV infection is now a pandemic, with most of those infected in developing countries, including sub-Saharan Africa. It has emerged as the most important cause of chronic liver disease world wide and an important cause of acute hepatitis and jaundice in pregnancy and its attendant complications, Ojule et al, 2008.

Results from several studies have shown variation in seroprevalence of HCV in childbearing women from 0.6% in Japan Uehara et al, 1993 to 4.5% in the United State (US) Reinus et al,1992. The principal risk factors were history of intravenous drug use and exposure to blood and blood products Ward et al, 2000. Available data out of Africa has shown a low prevalence (0.6%) of HCV infection among child bearing women in Sudan et al, 2007 with Egypt having the highest prevalence (19%)<sup>10</sup>. Recent studies

in Nigeria indicated that the HCV prevalence among pregnant women ranged from 4.3% to 9.2% (Ojule et al, 2008 & Paul et al 2007).

HCV is spread primarily by direct contact with human blood,Villano et al 1999. HCV antibody screening of blood and blood products introduced during the early 1990s has minimised this mode of HCV acquisition, leaving vertical transmission from infected mothers as the predominant mode of infection in children. It is worthy of note that, though HCV was identified in 1989, no effective screening test for the infection was available until 1992. Thus all women who had caesarean section, vaginal birth or other gynaecological procedures which required blood transfusion prior to 1992 were at risk for hepatitis C. Vertical transmission of HCV may occur at conception, in utero, perinatally, or during lactation. Its mechanisms, including timing, remain largely unknown, Hadzic 2001. The dominant route for acquisition of HCV infection in children in the developed countries is maternal-infant transmission with an estimated transmission rate of 5% Resti et al 1998.

No vaccine is currently available to prevent hepatitis C and treatment for chronic hepatitis C is too costly for most persons in developing countries. Thus from the global perspective, the greatest impact on hepatitis C disease burden will likely be achieved by focusing efforts on reducing the risk of HCV transmission from nosocomial exposure (e.g. blood

transfusions, unsafe injection practices) and high risk behaviours (e.g. injection drug use) WHO,1999.

Given that childbearing women are at high risk of acquiring and transmitting HCV infection (especially to their unborn foetus), there is need to identify HCV carriers among women in the study area. This study therefore is aimed at the detection of subjects with HCV infection, increasing awareness about the disease and aiding health care providers in the management of infected individual. It is also aimed at preventing emanating complications of the disease and to reduce its attendant socio-economic burden in the study area assuming its presence is confirmed.

## 2. Materials and methods

**Study area:** This study was hospital based and sampling was carried out at Vom Christian Hospital, Vom in Plateau State. Due ethical clearance was sought and granted for the study.

**Study population:** Three-hundred (300) blood samples from women of childbearing age attending Vom Christian Hospital. Informed consent was obtained from every participant before a structured questionnaire was administered to each. The questionnaire was designed to obtain their socio-demographic predispositions and risk factors that expose individuals to HCV infection. These can be seen in table 1 of results presented.

**Collection and processing of blood samples:** 5ml of blood sample was collected by venepuncture from the antecubital fossa of the arm after disinfection with 70% alcohol. Samples were placed in labelled sterile test tubes and allowed to clot. The sera was separated out into pre-labelled cryovials and transported in a cold box to Virology laboratory of the Federal College of Veterinary and Medical Laboratory Technology (FCVMLT) Vom, Plateau State. These were stored at -20°C until tested.

**antibodies:** Detection of HCV antibodies was carried out using commercially available One Step Rapid Test HCV kits (PISTIS Diagnostic Ltd; USA), a rapid chromatographic immunoassay for the qualitative detection of antibody to HCV in serum or plasma. Manufacturer's instructions were strictly adhered to.

**Test procedure:** Sera samples were removed from the -20°C freezer and allowed to thaw and attain room temperature. Each strip with arrow pointing downwards was removed from the pouch and immersed vertically into a sample. The strip was removed after 10 seconds and results read within 10 – 20 minutes.

Statistical analysis

Data obtained were analysed using SPSS computer software.

**3. Results:** 27 (9.0%) of the 300 samples screened were seropositive for HCV as seen in Table 1. Women of age groups 21-25 and 26-30 years showed HCV-seropositivity of 8 (8.2%; 9.3% respectively). This was the highest value of prevalence recorded in age groups as seen in table 2. Statistically, there exists no significant difference in the association between age and seroprevalence of HCV ( $P = 0.20$ ).

The seroprevalence of HCV with respect to demographics showed that they really did not play a major role in the contraction of the disease as seen in table 2. Married women recorded 9.2% seropositivity. Women with low educational standing showed 12.5% seropositivity. Unemployed women had a prevalence of 10.7%. Considering gravidity, a 13.8% value was recorded. HCV seroprevalence with respect to predisposing risk factors showed that 9 (24.3%) out of 37 women with body marks or tattoos were seropositive for HCV. 2 (25%) of the 8 women who practised multiple sex partnership were also seropositive. All the women who had history of blood transfusion and surgical operation were seronegative as seen in table 2.

**Table 1: Prevalence of HCV antibodies**

Age group (years)	Nos. Screened (%)	Nos. Positive (%)	Nos. Negative (%)
16 – 20	65 (21.7%)	5 (7.7%)	60 (92.3%)
21 – 25	97 (32.3%)	8 (8.2%)	89 (91.8%)
26 – 30	86 (28.7%)	8 (9.3%)	78 (90.7%)
31 – 35	29 (9.7%)	2 (6.9%)	27 (93.1%)
36 – 40	15 (5.0%)	1 (6.7%)	14 (93.3%)
41 – 45	8 (2.6%)	3 (37.5%)	5 (62.5%)
<b>Total</b>	<b>300(100.0%)</b>	<b>27 (9.0%)</b>	<b>273 (91.0%)</b>

**Table 2: Prevalence of HCV antibodies correlated with demographic/ risk factors**

Variable	Nos. Screened (%)	Nos. Positive (%)	P VALUE
<b>Demographics</b>			
<b>Age</b>			0.20
16 – 20	65 (21.7%)	5 (7.7%)	
21 – 25	97 (32.3%)	8 (8.2%)	
26 – 30	86 (28.7%)	8 (9.3%)	
31 – 35	29 (9.7%)	2 (6.9%)	
36 – 40	15 (5.0%)	1 (6.7%)	
41 – 45	8 (2.6%)	3 (37.5%)	
<b>Marital Status</b>			0.8
Married	283 (94.4)%	26 (9.2%)	
Single	16 (5.3%)	1 (6.3%)	
Divorced	1 (0.3%)	0 (0.0%)	
<b>Educational Status</b>			0.20
Primary	182 (60.7%)	17 (9.3%)	
Secondary	72 (24.0%)	9 (12.5%)	
Tertiary	20 (6.7%)	0 (0.0%)	
Non-formal	26 (8.6%)	1 (3.8%)	
<b>Occupational Status</b>			0.20
Employed	14 (4.7%)	1 (7.1%)	
Unemployed	214 (71.3%)	23 (10.7%)	
Self-employed	72 (24.0%)	3 (4.2%)	
<b>Gravidity</b>			0.20
Yes	242 (80.7%)	19 (7.9%)	
No	58 (19.3%)	8 (13.8%)	
<b>Risk factors</b>			
<b>Blood transfusion</b>			
Yes	8 (2.7%)	0 (0.0%)	
No	292 (97.3%)		
<b>Surgical operation</b>			
Yes	18 (6.0%)	0 (0.0%)	
No	282 (94.0%)		
<b>Body marking/tattooing</b>			
Yes	37 (12.3%)	9 (24.3%)	
No	263 (87.7%)		
<b>Multiple sex partnership</b>			
Yes	8 (2.7%)	2(25.0)	
No	292 (97.3%)		

#### 4. Discussion

Our finding of 9.0% prevalence has important health implications for the large number of childbearing women and their families who reside in our location of study. This is because most of the infected women were ignorant of HCV infection neither are they aware of their infection status since they showed no symptoms and tend to assume normal lives.

This implies that there is considerable potential for the transmission of HCV infection to people around them especially to foetuses in the case of the 19 (7.9%) HCV seropositive pregnant women our finding is similar to the report from South Western Nigeria which reported a prevalence of 9.2% among similar subjects in a tertiary hospital in Ibadan<sup>11</sup>.

The seroprevalence of HCV in this study is high when compared to that described previously among similar subjects in some African countries such as: Sudan (0.6%)<sup>9</sup>, Tanzania (1.0%) Msuya et al 2006 and Burkina Faso (3.3%) Simpore, 2005 as well as in some developed countries such as Scotland (0.4%) and Brazil (1.5%) Lima et al, 2000 & Hutchinson et al, 2004. On the other hand, it appears low compared that previously reported in Malawi (16.5%) Ahmed, 1998 and Egypt (19%) Kassem et al 2000. These differences observed may be attributed to degree of exposure to risk factors in the study populations as we found out that demographic variables considered had no statistical significance with HCV seropositivity.

With regards to age groups screened, the highest prevalence of 37.5% was recorded among women of age group 41 – 45 years. This result agrees with the findings in previous work which showed increase in HCV seroprevalence with increase in age, Hutchinson et al 2004. However, statistical analysis showed no significant association between age and HCV seropositivity ( $P=0.20$ ) for our study only that those aged 21-30 years seemed to be more infected.

The fact that married women showed a higher seropositivity may point a finger to their route of infection suggesting that sexual exposure may facilitate the spread of HCV and they were told to advise their spouses to undergo HCV screening. Education and employment wise, we found out that women with low levels of education and the unemployed showed higher seroprevalence indicating that their low socio-economic and educational status may have contributed to their status, though this association may not be concrete, (El-Sheikh et al, 2007). This we attributed to poor enlightenment which is usually associated with poor educational background.

Assessment of risk factors among seropositive women revealed that 9 (24.3%) of the 37 women who had scarification such as body marks and tattoos were seropositive. Similarly, 8 women were involved in multiple sex partnership, but only 2 (25.0%) were seropositive. These suggest that these risk factors may be important in the spread of HCV infection among childbearing women. Worthy of note is the fact that a HCV sero-negative result does not imply immunity against future exposure to the virus. Therefore HCV screening on routine basis should be strongly considered for all childbearing women in this community since the disease presence has been established.

**Conclusion:** The result of this study indicates that HCV is endemic in the study area. Its prevalence among women of childbearing age (9.0%) was found to be as high as that obtained in the South Western part of the country and higher than rates recorded in some other African countries. Infected women can transmit the infection to their family members. Due to the high cost of treatment of HCV infection and the unavailability of a vaccine against HCV, efforts should be focused on preventive aspects like regular screening.

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